Coalition for a Sustainable Delta

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VIA E-MAIL

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Re: DISB Monitoring Prospectus

Dear Ms. Pearson and Dr. Dahm:

The Coalition for a Sustainable Delta ("Coalition") is a California nonprofit corporation comprised of agricultural, municipal, and industrial water users, as well as individuals in the San Joaquin Valley. The Coalition and its members depend on water from the Sacramento-San Joaquin Delta ("Delta") for their continued livelihood. Individual Coalition members frequently use the Delta for environmental, aesthetic, and recreational purposes; thus, the economic and non-economic interests of the Coalition and its members are dependent on a healthy and sustainable Delta ecosystem. The Coalition is committed to the development and application of high quality monitoring and research in order to make informed and efficient resource management decisions with respect to the Delta, its native species, and their habitats.

The Coalition appreciates the opportunity to review and provide comments on a prospectus supporting an initiative that intends to increase and coordinate natural resource monitoring in the Delta -- *Planning the Delta Independent Science Board's Review of the Monitoring Enterprise in the Sacramento-San Joaquin Delta (Draft 2-14-2017)*. We are heartened that the Delta Stewardship Council has recognized the value of, and is undertaking, this necessary and essential resource assessment effort. At the same time, we are concerned that the Prospectus and the agenda described in it -- 1) do not explicitly recognize a number of critical shortcomings in the Delta's current monitoring programs that need to be addressed in a new monitoring initiative, 2) do not consider the institutional capacities and structured decision-making framework that are necessary to support resource management planning, including planning for a more effective "monitoring endeavor" in the Delta, and 3) should not miss the opportunity to draft outside-scientist and stakeholder expertise into the process of designing and implementing an improved monitoring program for natural resources in the Delta.

Several statements in the Prospectus (italicized below) warrant further consideration.

The Delta Independent Science Board (Delta ISB), in conjunction with the Delta Science Program (DSP), will undertake a broad review of the monitoring enterprise in the Delta. The objective is to develop recommendations that: improve how current and future monitoring programs provide informational needs of management agencies; how individual and larger-scale monitoring programs can be better coordinated; and how monitoring data can support implementation of adaptive management and assessments of performance measures.

We understand that it is in the resource management agencies' institutional interest to respond to the Delta Independent Science Board, which apparently opined that it would be "*a disservice if compliance-monitoring requirements were not regarded as having the potential of becoming increasingly oriented toward or coordinated with more effectively measuring environmental outcomes or segregated from environmental monitoring*." But previous reviews and critiques of multiple monitoring programs in the Delta and adjacent areas of the San Francisco Estuary indicate that many past, ongoing, and planned monitoring efforts have been, are, and may in the future be not competent to the challenging task of environmental surveillance. To our knowledge, there are no ongoing monitoring programs that have been designed to differentiate among alternative explanations for environmental phenomena of concern to resource managers, that are capable of shedding light on the ways by which environmental stressors deleteriously effect desired resources and resource conditions, or that actually measure the performance of even large-scale management actions undertaken in the Delta (for example, aquatic vegetation removal, habitat restoration, and operational limits imposed on various water diversions). There can be no direct way of *more effectively* managing environmental outcomes until a monitoring scheme that meets scientific standards is designed for and implemented in the Delta.

Inventories of physico-chemical, biological, and social science monitoring programs, which will be completed by a contractor following issuance of an RFP, will describe what is being monitored, how it is done, and for what purposes; identify the gaps in monitoring; determine whether an appropriate level of scientific rigor is being used in current programs to meet the needs of management and policy decisions; and recommend how the monitoring enterprise can be improved, consolidated, coordinated, and streamlined.

Rather than jumping ahead to consider "how the monitoring enterprise can be improved, consolidated, coordinated, and streamlined," it would be prudent for the new Delta monitoring initiative to focus on developing the means by which the Delta's resource agencies can institutionalize resource assessment and evaluation that recognizes the enabling characteristics of effectiveness monitoring and incorporates that monitoring into structured decision-making. That foundational need has not been met to date by resource managers in the Delta.

The pathway to improved resource monitoring in the Delta requires an honest appraisal of past and ongoing assessment efforts. The premise that the standing resource monitoring programs in the Delta rise to even the most basic level of scientific rigor is not consistent with the facts.

Furthermore, prior activities affixed with the label "adaptive management," such as VAMP and FLASH only paid lip service to the concept, which requires a combination of technical competence, resources, and discipline that are rarely mustered in concert. The Prospectus suggests otherwise and indicates -- *in some cases monitoring efforts could be improved if they were better linked with each other* -- that several long-established but ineffective monitoring efforts may provide a basis or foundation for an improved monitoring agenda. Perhaps its authors might identify any candidate monitoring efforts that could be improved if somehow linked together.

The monitoring enterprise in the Delta ranges across many disciplines in the natural and biological sciences, and extends into social science as well. These programs, while expensive, are important to many regulatory and research activities in the Delta. The monitoring data, in some cases now collected over decades, have improved management and planning decisions

Monitoring has not has been adequate to assess the performance of any Delta management action related to ecosystem health or integrity, ecological community structure or function, or the survival and recovery of imperiled species. We appreciate the nod to the shortcomings in the Delta's programmatic monitoring efforts in the statement that *"the relationships of some monitoring programs to management objectives have not always been clear",* but a more forthcoming appraisal would observe that not one management action carried out in the Delta over the past several decades has been accompanied by a monitoring scheme that could be used to judge whether management objectives have been met.

Even the most recent monitoring plan, the long-awaited *Delta Regional Monitoring Program (Delta RMP) Monitoring Design,* which by all rights should have benefitted from lessons learned from previous attempts at environmental assessment in the Delta, has not earned the blessing of experts. The polite critique in the *Independent Panel Review: Phase one* (released September 2016) stated that "the main tasks of a monitoring plan are to define the quantities and summaries needed to address the management and assessment questions, and to specify a sampling scheme that will lead to estimates of these summaries that are reliable enough to be useful." The Independent Review Panel described the Monitoring Design Summary as "silent on most of these tasks." The Delta RMP fell so short of meeting program needs and responsibilities the review panel was compelled to offer a primer on the goals and objectives of monitoring programs, the features of effective monitoring, and "essential components of monitoring programs designed to assess status and trend." The effort was sent back to square one.

It is not just one-off reviews that have found monitoring in the Delta to fall short off minimum standards. In a similar vein the Independent Review Panel in their Reports for Long-term Operations Biological Opinions (LOBO) Annual Science Reviews has implored the federal wildlife agencies to eschew "outdated data gathering methods," correct the "lack of accuracy, resolution, and redundancy in instrumentation," and forgo using "delta smelt indices derived from inadequate sampling methods" to inform management actions in a series of annual

reviews beginning in 2010. In its 2015 review the panel goes so far as to describe an agency action as taking "a productive direction for understanding any actual relationship between water operations and jeopardy" in delta smelt. It is remarkable that nearly a decade after issuance of the biological opinion regarding the effects of Water Project operations on delta smelt the standing expert panel is still awaiting validation of the assertions made in that biological opinion. This is the case because, while the state and federal agencies appropriate index data on delta smelt from general fish surveys, the monitoring of delta smelt adequate to pick up a signal of the species' response to management actions and required in the biological opinion and by law has not been undertaken.

Although these monitoring efforts clearly have enhanced our understanding of the Delta and contributed to more effective management, a better coordinated and well-designed monitoring enterprise that includes both compliance and environmental monitoring could provide a solid foundation for assessing the effectiveness of activities in the Delta, promoting the implementation of adaptive management, and planning for future changes.

Again, we commend the authors of the Prospectus for recognizing that "a better coordinated and well-designed monitoring enterprise" is essential to steer resource management in the Delta to where it has long needed to go. However, the imperiled delta smelt stands emblematic of lost opportunities to inform conservation from a well-designed monitoring effort. It shows how ill-designed monitoring can steer conservation actions away from a species' needs and toward expensive, faulty, and ineffective actions. The IEP's singular focus on fish surveys that virtually exclusively sample the open waters of the Bay and Delta have fostered mischaracterization of the delta smelt as a pelagic fish that was going extinct when few of them turned up in recent years in a sampling scheme that systematically missed their near-shore habitats. Surely the delta smelt has declined in numbers, but absent a well-designed monitoring program, the cause(s) and extent of the decline remain a mystery and recovery of the species remains elusive.

Unfortunately, the most recent attempt to better resolve delta smelt numbers in an effort to assess proportional entrainment at the water export pumps in the south Delta seems to be unsuccessful. While the Enhanced Delta Smelt Monitoring scheme added sampling strata that differentiated between areas that support high and low densities of delta smelt and areas in which delta smelt are at high and low risk of entrainment, the enhanced survey perpetuated sampling design features that virtually completely miss delta smelt habitat areas (the habitat strata or types) on the bathymetric gradient of channels, on shoals and in shallows, and on inundated floodplains and marsh plains, areas that have long been known to support the greatest number of delta smelt. Predictably the population estimates drawn from survey returns taken from the ecologically indefensible sampling frame have bounced about, varying more than a order of magnitude from week to week through the recent winter months. The notion that it is defensible to develop weekly population abundance estimates for the species is

preposterous, and the fact that a population of pre-spawning individuals appears to be widely fluctuating simply reinforces the point.

The data that emerge from poorly designed monitoring schemes, or monitoring absent design at all, like the data on delta smelt and longfin smelt generated from long-term fish surveys in the Bay and Delta, aren't just unhelpful, their application has led to expensive, wasteful, and even ecologically damaging management prescriptions. Delta smelt don't need and can't use high outflow through the Delta in the autumn, it may be deleterious to individual growth and survivorship. Increased outflow in the spring appears not to increase longfin smelt reproductive performance, rather it pushes longfin smelt offspring out of the west Delta into San Pablo Bay with unknown effects on survivorship. Both species undoubtedly can benefit from flows-related ecological phenomena, but how and why they do inevitably are lost when glib interpretations are made from unfocused long-term survey data. Avoiding the missteps that have plagued the design of monitoring programs targeting the Delta's fishes, demands no less than the involvement of field biologists, quantitative ecologists, and mathematical statisticians, a combination of participants that has not been engaged in any of the previous monitoring efforts in the Delta.

There are numerous monitoring efforts ongoing in California that owe their genesis to permit conditions (e.g., Peter Moyle's long-term monitoring and research tracking the populations of a number of fish species, or the long-term record on Lake Tahoe assembled by the Tahoe Research Group) and add value beyond the permitting process.

There is a place for baseline data-collection schemes in the monitoring tool box, and data of that sort that have been gathered from Suisun Marsh and Lake Tahoe in long time-series do have intrinsic values, especially in alerting resource managers to apparent environmental problem when a measured variable moves outside historical bounds. But, make no mistake, the long data record on Lake Tahoe's clarity has been remarkably unhelpful in leading planners to management solutions. The absence of data collected in a spatially explicit experimental framework that could serve to differentiate among probable causes of Lake Tahoe's lost transparency leaves planners to engage in an ad hoc management agenda. Because the resource agencies do not use reliable scientific assessment tools in an experimental framework, scientists are left to documenting the overall trends of a few Lake Tahoe resources, instead of testing management hypotheses, and thereby directly contributing to the big environmental fix that everybody agrees is necessary there. There is effectively no monitoring of the performance of the many hugely expensive watershed-restoration and fuels-reduction projects that are ongoing or have been completed since the first Lake Tahoe summit.

Because there is deeply anchored firewall separating the scientific agenda at Lake Tahoe and the implementation of resource management actions, mangers have learned precious little while carrying out hundreds of millions of dollars worth of well-intended projects. They can't say whether the many millions spent on road armoring and storm-water capture has kept the

lake's clarity up when it otherwise would have been much reduced or whether the massive public-works effort is having any impact at all. That is because, as in the Delta, monitoring has not been designed to test and evaluate hypotheses about the causes of environmental stress to the natural system or the effects of alternative management-action scenarios. Unfortunately, monitoring at Lake Tahoe has not added "value beyond the permitting process" as is indicated in the Prospectus.

The Delta ISB will consider ways to: effectively network monitoring programs in the Delta to respond to current and future management challenges; increase effectiveness of the monitoring enterprise; enhance the capacity of monitoring data to inform management decisions and performance measures; and improve the applicability of monitoring data for adaptive management in the Delta.

The Prospectus does not convey how resource management must change in lock step with monitoring in order to facilitate effective assessment. Efforts to implement adaptive management elsewhere in the country clearly indicate that monitoring in support of resource management can only be effective if it is accompanied by structured decision-making, it utilizes best professional standards and practices, and it is informed by the best available scientific information.

The Prospectus describes effectiveness monitoring but does not describe the institutional foundation that allows for successful effectiveness monitoring. Any management action, the effects of which require monitoring that targets, for example, a desirable species and its habitat, must be informed and supported by a structured decision-making process that has considered the benefits and costs of that action and any scientifically defensible alternative actions. The selection of a management action, the effects of which require monitoring, must be informed by an effects analysis (or risk assessment) that accurately represents the biological mechanisms acting on the targeted species and its habitat, quantitative models that utilize the best available scientific information to link the management action to expected ecological outcomes, and specification of management-action thresholds that will trigger a management response. All that must precede the design of a monitoring scheme, and only then can the protocol attending an implemented management action be designed so to have sufficient statistical rigor to detect an effect on the managed system from the management action.

The Prospectus needs to acknowledge that a rule set will be developed to guide the design of monitoring programs, to identify the means by which monitoring schemes that fail to function are identified and retired, and to describe the skill sets of staff who will implement the monitoring. With that job in mind, one might ask whether the Delta Independent Science Board (ISB) has the expertise to play the central role proposed for it in the monitoring initiative. For more than a decade and a half the Independent Science Board has ably advised and assisted the resource management agencies in the Delta on a wide array of technical issues, with emphasis on the challenges faced by stewards of the imperiled ecosystems in the highly

disturbed Delta, but the disciplinary arena of resource assessment and monitoring is not its strong suit. Experts in the field of resource assessment and monitoring need to accompany the ISB on this job – a job that includes identifying the material steps necessary to provide a management-planning template that can support, service, and facilitate a professional and competent "monitoring endeavor."

…monitoring is also an essential component of adaptive management, a vital component of the Delta science enterprise.

We have been here before. A scientific advisory panel delivered a strategic planning document in 1999 advising the then-fledgling CalFed program to embrace adaptive management and institute an integrated monitoring agenda. In response, CalFed empaneled an Independent Science Board to advise the program's Environmental Restoration Program. That first ISB hosted adaptive management fora, pressed the state and federal resource agencies to bring reliable knowledge into regulatory decisions using the ISB's science advisory capacity, initiated the development of conceptual ecological models and started, but left unfinished, deliberations on programmatic performance measures. With the decommissioning of CalFed in 2005, came reconfiguration of the ISB, institutionalization of a Delta Science Program, and delivery of State of the Delta reports and in 2013 a Delta Science Plan that called out the essential role for adaptive management and robust monitoring to support it. Appeals for effective, efficient, and accountable resource monitoring in the Delta have met with institutional resistance for the past two decades.

Perhaps this new monitoring initiative signals the end to that resistance. We would hope that the Prospectus would be able to state unequivocally that the federal and state resources agencies will accept the direction that can be drawn from the review products and advisory guidance that will be offered in this new monitoring initiative. We request that the Prospectus recognize that monitoring is just one element in a transparent structured decision-making process, that it must employ rigorous design informed by the best available science, and that it can only benefit from technical input from stakeholder interests, including the regulated community.

We strongly suggest that this necessary and important monitoring initiative be devised and carried out with meaningful stakeholder input.

We hope that the observations offered here can assist in guiding the Delta Science Program's efforts (in their words) "to improve how current and future monitoring programs serve the present and expected informational needs of management agencies, how individual and larger-scale monitoring programs can be better coordinated, and how monitoring data can support implementation of adaptive management and assessments of performance measures." As an organization greatly concerned about the fate of the Delta's imperiled native species, the Coalition for a Sustainable Delta encourages the Delta's resource agencies to move with

dispatch through its planned review of past and ongoing monitoring programs into a committed inter-agency effort to design a structured decision-making process that supports management planning, to institutionalize adaptive approaches to resource management, and to implement monitoring protocols that are effective in measuring the performance of our efforts to meet the co-equal goals set forth in the Delta Reform Act.

Sincerely,

William D. Phillimore

Cc: Rainer Hoenicke, Ph.D., Deputy Executive Officer